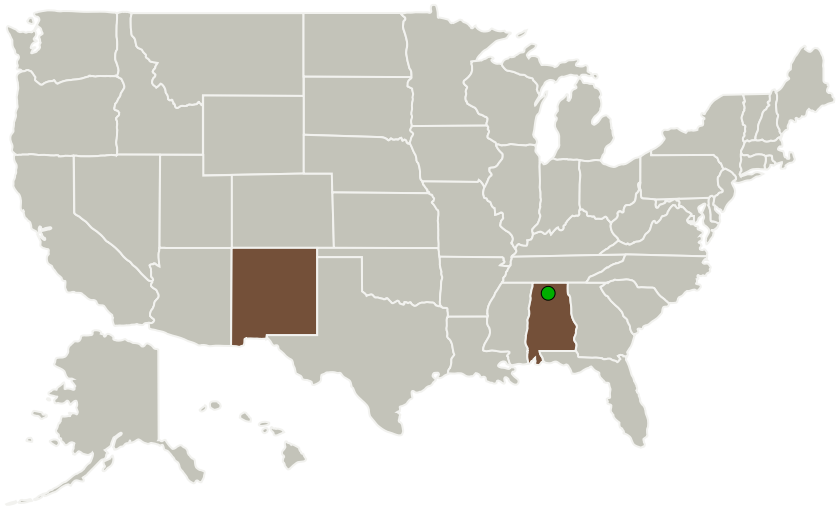
Structural Origami Array (SOAR), Phase I

Completed Technology Project (2016 - 2016)

Project Introduction

For small satellite program managers and integrators, who must contend with increasing power consumption of small spacecraft with advanced electric propulsion and/or science instrumentation, the Structural Origami ARray (SOAR) is an extremely high performance deployable solar array system that delivers 200W to 1kW+ power output, while exceeding state-of-the-art packaging efficiencies. Unlike existing folding panel or rolled architectures, our approach utilizes a simple reliable deployable supporting structure and a two-dimensional origami packaging scheme of the flexible blanket/substrate that exhibits several unique and enabling characteristics. These include a perfect packaging efficiency, equal to z-folding; small stowed square form factor to easily fit into any small satellite; easily scalable to create longer arrays with little impact on stowed height, complexity, and structural performance; uniform folding mechanics for simple electronic harnessing; deterministic folding kinematics that unfold in two dimensions when pulled along its length, which minimizes potential array damage during deployment; and an inherent thickness insensitivity, which allows for the uses of thicker, long lifespan or high efficiency photovoltaic cells.

Primary U.S. Work Locations and Key Partners



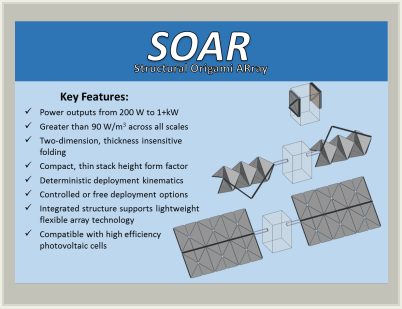


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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
LoadPath	Lead Organization	Industry	Albuquerque, New Mexico
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	New Mexico

Project Transitions

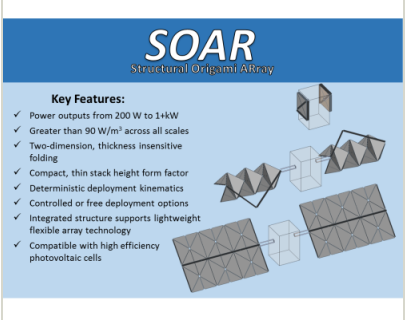
June 2016: Project Start

December 2016: Closed out

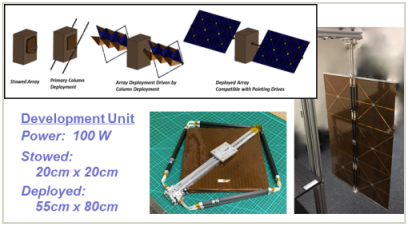
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140843)*

Images



Briefing Chart Image
Structural Origami Array (SOAR), Phase I
(https://techport.nasa.gov/image/137038)



Final Summary Chart Image
Structural Origami Array (SOAR), Phase I Project Image
(https://techport.nasa.gov/image/126142)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
LoadPath

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

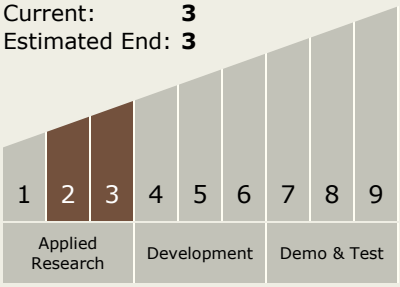
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Joseph Footdale

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System